ABSTRACT OF THE DISCLOSURE

Disclosed herein is a superconducting rotor with a cooling system located inside. The rotor comprises a superconducting field coil for generating a strong magnetic field, a field coil supporting member for supporting the superconducting field coil, and a pulse tube refrigerator. The pulse tube refrigerator comprises an annular-shaped regenerating tube disposed inside the field coil supporting member and connected to a low temperature end connection part, a pulse tube disposed inside the regenerating tube and connected to the regenerating tube, a high temperature end connection part connected between the regenerating tube and the pulse tube, a working fluid flowing tube disposed at the high temperature end of the regenerating tube for allowing a high pressure gas to flow into the regenerating tube and a low pressure gas to flow out of the regenerating tube, a double gas inlet valve connected between the working fluid flowing tube and the pulse tube at the high temperature end connection part, and a gas buffer tank connected to the pulse tube at the high temperature end connection part via an orifice valve. To the field coil supporting member is connected with a torque tube for transmitting a rotating force to the outside. The pulse tube refrigerator installed inside the field coil is operated to cool the field coil

to a working temperature at which the field coil is maintained at a superconducting state.